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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/900,479	07/06/2001	Mikhail Ivanovich Trifonov	1202.017US1	4160

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MARK A. LITMAN & ASSOCIATES, P.A.
York Business Center
Suite 205
3209 West 76th Street
Edina, MN 55435

EXAMINER	
TUCKER, WESLEY J	

ART UNIT	PAPER NUMBER
2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/900,479	Applicant(s) TRIFONOV ET AL.	
	Examiner Wes Tucker	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,881,182 to Fiete et al.

With regard to claim 1, Fiete discloses a method for removing line-like defects from an image by providing image data in digital form, analyzing segments of the image data as groups of pixels (column 2, lines 48-50), detecting line defects in the image by application of a line detector (column 2, lines 48-50) and adjusting the image data to correct the detected line defects within the determined limits (column 2, lines 58-60).

With regard to claim 3, Fiete discloses the method of claim 1 in which the line detector detects a line according to at least one characteristic from the group comprising line lightness higher than the surroundings, line lightness lower than the surroundings, line contrast with respect to surroundings (column 3, lines 54-63), and line orientation with respect to the image borders (column 5, lines 47-50). Line

lightness, darkness, or contrast is interpreted as the illumination radiance function and the line orientation is interpreted as the slope determination.

With regard to claim 5, Fiete discloses the method of claim 1 wherein the image is a color image (column 3, lines 45-50). Fiete discloses using the method on photographic or film images both known to be in color.

With regard to claim 7, Fiete discloses the method of claim 1 wherein the image data is provided in a color space format that includes a brightness value (column 3, lines 53-63). Here the illumination function is considered to be a brightness value in the color space format.

With regard to claim 17, Fiete discloses a method of correcting line-like defects in a single still image without requiring the defects to be manually delineated, the method comprising providing image data in digital form, analyzing segments of the image data as groups of pixels (column 2, lines 48-50), automatically detecting line defects in the image, and adjusting the image data to correct the detected line defects (column 2, lines 48-50).

With regard to claim 26, Fiete discloses a computer containing software and hardware that enables execution of the process of claim 1 (column 2, lines 30-35). It is

understood that a computer containing hardware and software are necessary to perform operations on digital images.

With regard to claim 28, Fiete discloses a method for removing line defects from a still image by providing image data in digital form, analyzing segments of the image data as groups of pixels (column 2, lines 48-50), detecting line defects in the image, detecting line defects in the image within a specified range of widths without manually designating the spatial location of the line defects (column 2, lines 48-50), and adjusting the image data to correct the detected line (column 2, lines 58-60). It is understood that the lines must be a within a predetermined range of widths to be considered lines.

With regard to claim 29, Fiete discloses a method for removing line defects from a still image comprising providing image data in digital form (column 2, lines 48-50), detecting line defects in the image of a specified brightness, as either higher or lower brightness than a predetermined value (column 3, lines 54-62), compared to surrounding pixels without manually designating the spatial location of the line defects (column 2, lines 48-50), and adjusting the image data to correct the detected line (column 2, lines 58-60). The correlation of the pixels in determining streaks relies on the intensity of illumination in relation to pixel values. The intensity of illumination is considered to be a value of brightness and is relied upon for determining pixel differences and therefore streaking.

With regard to claim 30, Fiete discloses a method for removing line defects from a still image by providing image data in digital form (column 2, lines 48-50), detecting line defects in the image of a specified contrast compared to surrounding pixels without manually designating the spatial location of the line defects (column 2, lines 48-50), and adjusting the image data to correct the detected line (column 2, 58-60). Here specified contrast is considered to be the pixel-to-pixel differences. The pixel values of the streak must be a certain amount more or less than their surrounding pixels creating a contrast of a specified value.

With regard to claim 31, Fiete discloses a method for removing line defects from a still image by providing image data in digital form (column 2, lines 48-50), detecting line defects in the image of a specified range of sharpness without manually designating the spatial location of the line defects (column 2, lines 48-50), and adjusting the image data to correct the detected line (column 2, 58-60). The pixel values used to determine streaking must be a certain value in comparison to the surrounding image in order for a streak or line-defect to be detected, so it is considered that the streak must be a certain measure of sharpness to enable detection having a large enough difference between the area pixels.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,881,182 to Fiete et al.

With regard to claim 16, Fiete discloses the method of claim 1, but does not disclose wherein an operator of the method selects the type of line defect to be corrected by selecting from among the group consisting of a) light line defects, b) dark line defects, and c) both light line defects and dark line defects. The streaks in the method of Fiete are determined by pixel contrast or difference with the surrounding pixels. It would have been obvious to one of ordinary skill in the art at the time of invention to set the difference thresholds according to the lightness or darkness of the streak pixels in order to remove either a dark or light streak.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent to Fiete et al. and The Sony Corporation publication: "Combining Frequency and Spatial Domain Information for Fast Interactive Image Noise Removal" by Anil N. Hirani and Takashi Totsuka hereinafter referred to as Hirani.

With regard to claim 23, Fiete discloses the method of claim 1, but does not disclose that the operator marks a selected area of the image on which to practice the method. Hirani discloses a method for removing streaking artifacts wherein a user selects sub-images or areas within an image on which to perform the correction (section 4.1, first 10 lines). It is well known in the art of image processing to perform image enhancing operations on selected areas of an image in order to enhance on certain parts of the image while keeping the rest of the image unchanged. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have a user select the areas of an image to enhance so that only portions of the image would be changed.

Claims 2, 4, 6, 8-14, 18, 19, 21, 22, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent to Fiete et al. and U.S. Patent 6,408,109 to Silver et al.

With regard to claim 2, Fiete discloses a method for removing line-like defects from an image by providing image data in digital form, analyzing segments of the image data as groups of pixels, detecting line defects in the image and adjusting the image data to correct the detected line defects within the determined limits. Fiete does not disclose detecting line defects by application of a local radial angular transform. Silver

discloses a method of determining gradients or lines in an image through the application of a local radial angular transform (Figs. 3A and 3B). Here these shapes and overlays are considered to be functionally equivalent to local radial angular transforms in that they determine the direction and magnitude of the gradients. It is well known in the art to use different shapes and formations of pixels to better detect linear gradients, edges or line-like defects. Therefore it would have been obvious to one of ordinary skill in the art to use the radial angular transform of Silver in the invention of Fiete in order to better detect the gradients or streaks.

With regard to claim 4, Fiete discloses the method in which the line detector detects a line according to at least one characteristic from the group comprising line lightness higher than the surroundings, line lightness lower than the surroundings, line contrast with respect to surroundings (column 3, lines 54-63), and line orientation with respect to the image borders (column 5, lines 47-50). Line lightness, darkness, or contrast is interpreted as the illumination radiance function and the line orientation is interpreted as the slope determination.

With regard to claim 6, Fiete discloses the method wherein the image is a color image (column 3, lines 45-50). Fiete discloses using the method on photographic or film images both known to be in color.

With regard to claim 8, Fiete discloses the method wherein the image data is provided in a color space format that includes a brightness value (column 3, lines 53-63). Here the illumination function is considered to be a brightness value in the color space format.

With regard to claim 9, Silver discloses the method wherein a geometric pattern of groups of pixels is selected and used to detect line-like structures in image data (Figs. 3A and 3B).

With regard to claim 10, Silver discloses the method of claim 9 wherein the geometric pattern comprises hexons (Figs. 1B, 1C, 1D, and 3A and 3B).

With regard to claim 11, Silver discloses the method wherein a geometric pattern of groups of pixels is selected and used to detect line-like structures in image data (Figs. 3A and 3B).

With regard to claim 12, Silver discloses the method wherein the geometric pattern comprises hexons (Figs. 3A and 3B).

With regard to claim 13, Silver discloses the method wherein the hexons are laid over the image (Figs. 3A and 3B).

With regard to claim 14, Silver discloses the method of claim 13 wherein a modulus of the transformation coefficient, c3, is used to indicate the presence of a line-like feature in the image under the hexon over the image (column 3, lines 19-35). Here G is interpreted as a coefficient and if it is greater than a certain value the gradient representative of G is deemed to be an edge or line-like feature under the hexon.

With regard to claim 15, Silver discloses the method wherein brightness differences within the groups of pixels are used to identify line-like features (column 7, lines 30-34). Here the kernels are used with pixel clusters possessing brightness values.

With regard to claim 18, Fiete discloses the method of claim 17, but does not disclose automatically detecting line defects in the image being affected by application of a local radial angular transform. Silver discloses a method of determining gradients or lines in an image through the application of a local radial angular transform (Figs. 3A and 3B). Here these shapes and overlays are considered to be functionally equivalent to local radial angular transforms in that they determine the direction and magnitude of the gradients. It is well known in the art to use different shapes and formations of pixels to better detect linear gradients, edges or line-like defects. Therefore it would have been obvious to one of ordinary skill in the art to use the radial angular transform of Silver in the invention of Fiete in order to better detect the gradients or streaks.

With regard to claim 19, Fiete discloses the method of claim 17 wherein automatically detecting defects in the image is determined by a program which analyzes for line-like patterns and their relative darkness or lightness with respect to surrounding pixels or surrounding pixel groups (column 3, lines 54-63). Line lightness, darkness, or contrast is interpreted as the illumination radiance function.

With regard to claim 20, Fiete discloses the method of claim 17 wherein automatically detecting defects in the image is determined by a program, which analyzes for line-like patterns and their contrast with respect to the surroundings (column 3, lines 54-63). Line lightness, darkness, or contrast is interpreted as the illumination radiance function.

With regard to claim 21, Silver discloses the method of claim 2 wherein limits of detection are imposed (column 12, lines 57-64), but does not discloses allowing an operator to adjust the two contrast limits L, and LZ to restrict what regions of the image are to be selected as a defect area. It would have been obvious to one of ordinary skill in the art at the time of invention to allow an operator to set the limits of contrast in order to define what would be classified as a streak or line.

With regard to claim 22, Silver discloses the method of claim 2 wherein only values of a lines strength metric, [c3], satisfying the relationship L, [C3] L2, where 0 < L1

< L2 [C3] max, are considered to represent a defect, wherein Li defines a lower contrast limit and L2 defines an upper contrast limit (column 12, lines 65-68 and column 13, lines 1-10). Here Silver describes how limits are used to define what is a gradient and what is not.

With regard to claim 25, Silver discloses a threshold value to determine limits on detected line defects to be treated is applied to data from application of a local radial angular transform (column 12, lines 57-64 and Figs. 3A and 3B).

With regard to claim 27, Fiete discloses a computer containing software and hardware that enables execution of the process of claim 2 (column 2, lines 30-35). It is understood that a computer containing hardware and software are necessary to perform operations on digital images.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,881,182 to Fiete et al. and U.S. Patent 6,408,109 to Silver et al. and The Sony Corporation publication: "Combining Frequency and Spatial Domain Information for Fast Interactive Image Noise Removal" by Anil N. Hirani and Takashi Totsuka hereinafter referred to as Hirani.

With regard to claim 24, Fiete and Silver disclose the method of claim 2, but do not disclose that the operator marks a selected area of the image on which to practice the method. Hirani discloses a method for removing streaking artifacts wherein a user selects sub-images or areas within an image on which to perform the correction (section 4.1, first 10 lines). It is well known in the art of image processing to perform image enhancing operations on selected areas of an image in order to enhance on certain parts of the image while keeping the rest of the image unchanged. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have a user select the areas of an image to enhance so that only portions of the image would be changed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 703-305-6700. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wes Tucker
5-27-04

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600